

# A study on oral care practices in intensive care units at two tertiary hospitals in Kelantan

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## ABSTRACT

Dental plaque colonized with bacteria can be aspirated from the oropharynx to the lungs, and leads to Ventilator-associated Pneumonia. Proper practice of removal the dental plaque by brushing the teeth using the child toothbrush was shown to be effective in preventing the accumulation of dental plaque. This study aims to determine the current oral care practices in the Intensive Care Unit in two tertiary hospitals in Kelantan. The total of 261 nurses participated in this study. The overall finding from this study showed that only a small proportion of the nurses used the child toothbrush for oral care practice. This study showed there is a need to have a standardized protocol for oral care in the ICUs in order to improve nurses oral care practice

**Keywords:** Intensive Care Unit, nurses, oral care practice

## INTRODUCTION

Mechanically ventilated patients in the Intensive Care Units (ICUs) are high risk of dental plaque colonization due to difficulties in oral care, changes in salivary properties and the reduction of anaerobic flora by antibiotic therapy. Dental plaque can act as a reservoir for the microbes to migrate into the patient's lungs. Dental plaque colonized with bacteria can be aspirated from the oropharynx to the lung and leads to Ventilator-Associated Pneumonia (VAP) (Berry *et al.* 2007, Grap *et al.* 2003). Proper practice of dental plaque removal by brushing the teeth using the child toothbrush was shown to be effective in preventing the accumulation of dental plaque (Cutler & Davis 2005, Scannapieco *et al.* 1992). Brushing of teeth can prevent the formation of dental plaque and also maintaining the integrity of oral tissue (Grap *et al.* 2003, Ory *et al.* 2017). In Malaysia, there are few studies conducted in relation to knowledge and oral care practice in the ICUs (Soh *et al.* 2012, Soh *et al.* 2011). This study was to determine the oral care practices in ICUs at two tertiary hospitals in Kelantan.

## Methodology

### Design

This is a cross-sectional study using self-administered questionnaire. This study was carried out from October 2006 to January 2007. A self-administered questionnaire was used to determine oral care practices among nurses in Hospital A (teaching) and Hospital B (government) in Kelantan, Malaysia.

### Setting

During the period of the study there are four ICUs in Hospital A, which are General Intensive Care Unit (GICU), Cardiothoracic Intensive Care Unit (CICU), Coronary Care Unit (CCU), and Neurosurgery Intensive Care Unit (NICU). The hospital is located eight (8) kilometers from the City Centre in Kelantan. Hospital A General ICU is a multi-discipline ICU, which consists of ten beds, and the total number of staff is 46 people including one ward sister. It has eight beds for open cubicles and two beds in a separated room. The total number of beds in the Cardiothoracic ICU is ten. The number of staff working in CICU is 25 people. In the Coronary Care Unit (CCU), there are six beds in a separate room, and the total number of the staff is 18. Intensive Care Unit sister covered both the CICU and the CCU, whereas in Neurosurgery ICU, there are 12 beds available and a total number of the staff is 38 people including one sister. Hospital B is located in the city. The hospital B is the main tertiary hospital in Kelantan under the Malaysian Ministry of Health. The hospital consists of 2290 workers and 910 registered nurses, and 920 beds for its patients. Intensive Care Unit has various wards such as Medical High Dependency Ward (MHDW) for Medical cases and General High Dependency Ward (GHDW) for patients post ICU before the patients are sent to the general ward. There are 41 ICU nurses in MHDW with the bed occupancy of twenty-two beds, whereas in GHDW, there are 24 beds with 28 nurses. In the ICU, there are 11 beds with a total of ICU nurses are 55 nurses. In the Coronary Care Unit (CCU) and Cardio Rehabilitation Ward (CRW), there are 20 beds with a total number of the 40 nurses.

**Participants**

The study includes all ICU nurses, working in the ICU, which also consists of NICU, CICU and CCU in Hospital A. All nurses in the GICU, GHDW, MHDW and CCU, and CRW in Hospital B. The inclusion criteria are all nurses and ward manager who is working at the time of the study was conducted, and the exclusion criteria are the nurses who are working in Neonatal ICU and assistant nurse. The sample size calculation was based on Snedecor and Cochran (1989) and a total of 199 nurses were required to participate in the study.

**Study instrument**

Self-administered questionnaires were adapted from Jones et al, (2004). The questionnaires were sent to six experts for peer review. The experts are two anesthesiologists, one nursing lecturer, two ward managers and one nurse who have experienced more than 10 years working in ICU. The questionnaires were reviewed, and the modification was done based on the comment from the experts. The pilot study was carried out in Serdang Hospital. Questionnaires were distributed to 30 ICU nurses and a total of 23 nurses returned the completed questionnaires. The returned questionnaires were reviewed with no the alteration was made.

**Data collection**

The questionnaires were distributed to the ICU ward managers, and then she distributed the

questionnaires to all the ICU it nurses started in December 2006 and completed in January 2007. The completed questionnaires were placed into a box provided. Returning the completed questionnaires were considered consented for the study.

**Data analysis**

The data were analyzed using the Statistical Package for Social Sciences (SPSS) 22.0 standard version. Descriptive data analysis including the central tendency and dispersion involving mean, standard deviation, frequency and percentages for the oral care practice among nurses in both hospitals was used.

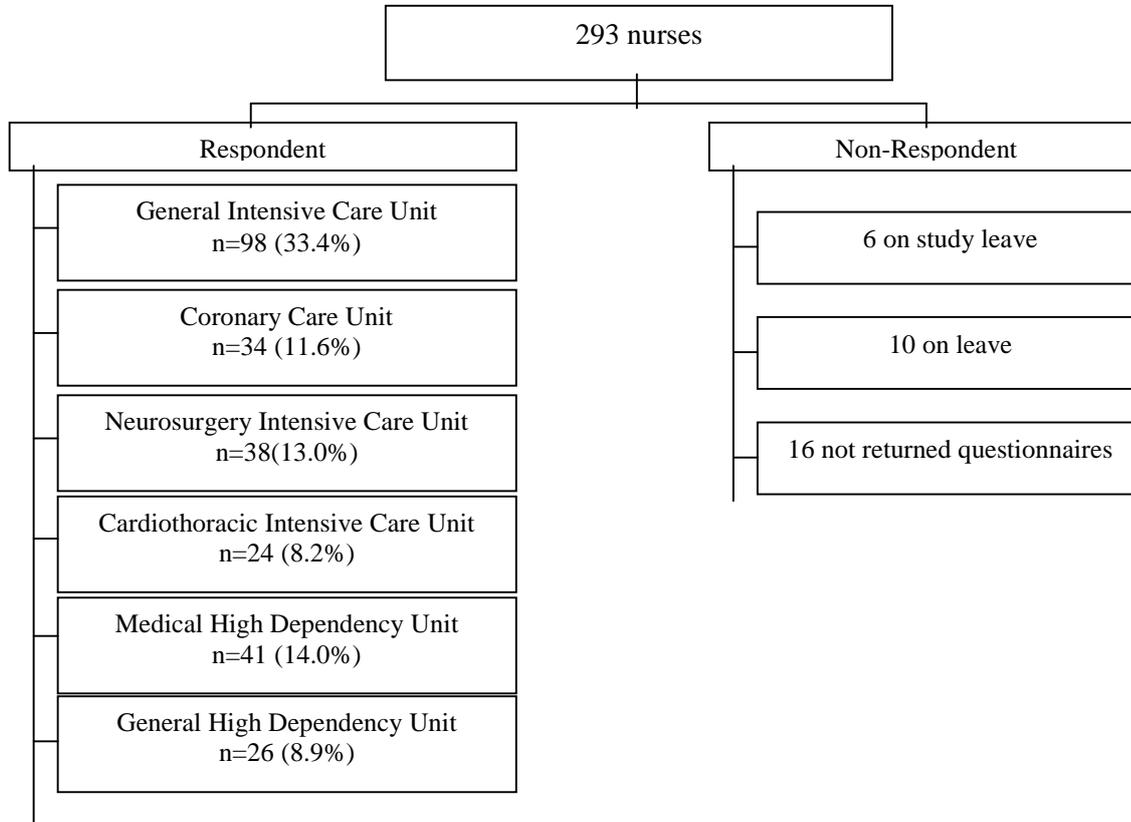
**Ethical considerations**

An approval from the university Medical Research Ethical Committee and approval to conduct the study by Director of the university and public hospitals were granted. All participants in this study were provided with a written explanation and participation were anonymous.

**Results**

**Response rate**

There were 293 nurses working in both hospitals. Two hundred and sixty one (89.1%) nurses returned the completed questionnaires. The total number of non-respondents was 32(10.9%). The distributions of the response rates are shown in Figure 1.



**Figure 1: Response rate**

The mean age of the nurses was 32.0±SD7.2 years old. The age of the participants ranged from 20 years to 54 years old. The majority of the

participants' basic qualifications were diploma in nursing (83.1%), while 44 participants (16.9%) had

certificate qualification. Other demographic characteristics are shown in Table 1:

**Table 1: Demographic characteristics (n=261)**

Demographics	n (%)
Age : Mean ±SD	32.0 ±7.2
<b>Working Hour</b>	
Office hour	13(5.0)
Shift Duty	248(95.0)
<b>Basic Nursing Qualification</b>	
Diploma	217(83.1)
Certificate	44(16.9)
<b>Highest Nursing Qualification</b>	
Bachelor Degree	17(6.5)
Post Basic Critical Care	48(18.4)
Diploma in Nursing	178(68.2)
Certificate in Nursing	18(6.9)
<b>Current Position</b>	
Ward Manager/Sister	3(1.1)
Registered Nurse	258(98.9)
<b>Current Working Place</b>	
Medical/Surgical ICU	167(64.0)
Neurosurgery ICU	38(14.5)
Cardiothoracic	24(9.2)
Coronary Care Unit	32(12.3)
<b>Duration of Working Experience: Mean ±SD</b>	<b>8.9 ±6.1</b>
<b>Duration Working in the Unit: Mean ±SD</b>	<b>5.0± 4.9</b>
<b>Working Hospital</b>	
University Hospital A	120(46.0)
Government Hospital B	141(54.0)

**Protocols on oral care practices**

One hundred and eighty one (69.3%) participants indicated that oral care practice protocols were available in their units. However, 65(25.0%) participants said there were no protocols on oral care in the ICU and 15(5.7%) were not sure the protocol. In addition, of that ICU without Protocol on Oral Care Practices, 15(16.0%) participants responded that there was a plan to develop the Oral Care Practices Protocol.

**Current practices in oral care**

There were 130(49.8%) participants using the child toothbrush in their oral care practice and 196(75.1%) of participants used the adult toothbrush. A total of 246(94.3%) participants used forceps and gauze. Table 2 shows the distribution of participants reported on the usage of instruments in providing oral care in ICUs.

**Table 2: Instruments used in the oral care practice**

Items	Frequency (%) (n=261)	
	Yes	No
Forceps + Cotton	230(88.1)	31(11.9)
Forceps + Gauze	246(94.3)	15(5.7)
Cotton + Orange Stick	213(81.6)	48(18.4)
Adult Toothbrush	196(75.1)	65(24.9)
Child Toothbrush	130(49.8)	131(50.2)

**Oral mouthwash**

A total of 194 (74.3%) participants were using the chlorhexidine mouthwash in their oral care practice.

Other oral mouthwashes used in the ICUs are shown in Table 3.

**Table 3: Oral mouthwash used**

Item (n=261)	Frequency (%)	
	Yes	No
Chlorhexidine	194 (74.3)	67(25.7)
Sterile Water	166(63.6)	95(36.4)
Normal Saline	188(72.0)	73(28.0)
Thymol Gargle	194(74.3)	67(25.7)
Sodium Bicarbonate	175(67.0)	86(33.0)
Hydrogen Peroxide	33(12.6)	228(87.4)
Lemon and Glycerol	65(24.9)	196(75.1)
Tap Water	67(25.7)	194(74.3)

**Participants were allowed to select more than one mouth wash**

least twice a day. The distributions of the used child toothbrush for oral care practice are shown in Table 4.

**Use of child toothbrush for oral care practice**

Out of 261 participants, there were 88 (33.7%) participants who used the child toothbrush at the

**Table 4: Child toothbrush used at least twice a day for oral care**

Item (n=261)	Frequency (%)	
	Yes	No
Child toothbrush	88 (33.7)	173 (66.3)

**Hospital support factors in provision of oral care**

There were 250(95.8%) the participants said that there were supplies available in the unit and 10 (3.8%) said that no supplies in the unit. Only one

participant does not know if supplies were available in the unit. The distributions of the availability of supplies were shown in Table 5.

**Table 5: Hospital supplies for oral care**

Items (n=261)	Yes n(%)	No n(%)	Don't know n(%)
Forceps + Cotton	242(92.7)	19(7.3)	-
Forceps + Gauze	259(99.2)	2(0.8)	-
Cotton + Orange Stick	246(94.3)	13(4.9)	2(0.8)
Adult Tooth brush	136(52.1)	115(44.1)	10(3.8)
Child Tooth brush	70(26.8)	171(65.5)	20(7.7)
Toothpaste	95(36.4)	149(57.1)	17(6.5)
Chlorhexidine	113(43.3)	127(48.7)	21(8.0)
Sterile water	240(92.0)	17(6.5)	4(1.5)
Normal Saline	249(95.4)	10(3.8)	2(0.8)
Thymol Gargle	168(64.4)	71(27.2)	22(8.4)
Diflam C	122(46.8)	117(44.8)	22(8.4)
Lemon and Glycerol	29(11.1)	191(73.2)	41(15.7)
Sodium Bicarbonate	215(82.4)	37(14.2)	9(3.4)
Hydrogen Peroxide	138(52.9)	105(40.2)	18(6.9)

**Discussion**

This study describes the current practices of oral care for mechanically ventilated patients among nurses in two tertiary hospitals in Kelantan. The overall finding from this study showed that only a small proportion (33.7%) of the nurses used child toothbrush for oral care practice. As compared to study by Jones et al. (2004) found that 85.5% of the nurses using the toothbrushes as the provision of oral care in ICUs (Jones et al. 2004). Most of the nurses were using gauze and cotton in the provision of oral care. This study found that 50% of the nurses were using other methods in providing oral care, rather than child

toothbrushes. The finding of this study showed that the nurses were practicing the oral care based on local nursing training protocol. According to Tunner and Lawler (1999), nurse education in oral care practice has remained relatively unchanged. An analysis of the textbooks, it is revealed that the descriptions of actual nursing oral care practices have not significantly changed, although variation in the types of equipment and material recommended was noted (Tunner & Lawler 1999). The routine practice of the oral care only focuses on patients' comfort rather than plaque removal (Browsher et al. 1999, Grap et al. 2003). Cotton swabs, which

commonly used to provide oral care to patients unable to do their own care, were effective for stimulation of mucosal tissues but, were ineffective as plaque removal (Adam 1996, Pearson & Hutton 2002). The cotton swab has been found to be particularly ineffective in removing dental plaque, which had accumulated in areas between teeth, thus potentially to predispose the patients to ventilator-associated pneumonia (Cutler & Davis 2005, Fourrier *et al.* 1998, Pearson & Hutton 2002). The ICU nurses preference to use cotton swabs could be because its takes lesser time than brushing the teeth, convenient, require little set-up and clean-up time and facilitate quick completion of the task (Kite 1995, McCaughan *et al.* 2002, Perrie & Scribante 2011, Soh *et al.* 2012). The study done by Jones (2004) found that, from 103 participants of the study, the most popular of oral care was the cotton swabs and were used by the majority of the participants in the study (Jones *et al.* 2004). However, even though the cotton swabs most popular used by the nurses, the study done by Pearson and Hutton (2002) in comparing the ability of cotton swabs and the toothbrushes to remove dental plaque, found that the toothbrushes performed substantially better than cotton swabs. The recent evidence for oral care was mechanical intervention such as using the child toothbrush as the provision of oral care. The frequency of using those items was the child toothbrush at least twice a day (Cutler & Davis 2005, Pearson & Hutton 2002, Schleder & Pinzon 2004). In this study, more than 50% of the nurses used the chlorhexidine mouthwash, and the nurses also used others oral mouthwash solution in providing the oral care. This may be due to the nurses used the solution provided by the hospital. From the 261 participants, there were only 88 (33.7%) of them who used child toothbrush for oral care. In this study, most of the nurses used the adult toothbrushes (75%) to provide oral care, as compared to child toothbrushes (50%) at least twice a day to provide oral care (Browsher *et al.* 1999, Schleder & Pinzon 2004). The child toothbrush was recommended because of not only greater access to all regions of the mouth but could also be used to gently brush the tongue and the gum, and also can be used in edentulous patients (Browsher *et al.* 1999). While the toothbrush was more effective than cotton swabs, it was important to select a soft bristle or child toothbrush to reduce the incidence of injury to the oral mucosa. The adult toothbrushes were cumbersome and too large to fits around the endotracheal tube, so the child toothbrushes were suitable for intubated patients (Kite 1995). There is an interest to determine the effect of hospital supplies on the provision of oral care. Even though 250(95.8%) of the nurses, said that there were supplies available in the units, but in term of whether there were adequate supplies was not asked in the questionnaire. Lack of organizational support can affect the quality of

clinical practices and a major barrier to performing proper oral care when lacked appropriate equipment (McCaughan *et al.* 2002, Perrie & Scribante 2011). Nevertheless, in the study by Furr *et al.* (2004) found that the hospital factors concerning supplies and equipment were not related to care, contrary to the expectation, where by the nurses who believed that they have sufficiently available supplies for oral care would provide better care. Similarly, the study done by Kite (1995) said that the availability of the appropriate toothbrushes influence their used in ICUs; however many hospital supplies of mouthwash and cotton swabs rather than child toothbrushes, or the toothbrushes provided are poor quality, large and not readily accessible (Moore 1995). This study focused on the nurses' oral care practices for ventilated patients. The finding of this study could create an awareness of the nurses the important of practicing recommended oral care, to reduce the risk of ventilator-associated pneumonia. Recommendation of this study could be used to improve the current oral care practices. Several aspects of this study limit the robustness of its finding. This study only looked at the current oral care practice of the ICU nurses, and not their knowledge and their attitude concerning the provision of oral care. Perhaps in future, the study should be done to the ICU nurses' knowledge and attitude. This study only measured and reported those practices rather than utilizing direct observation of nursing practice to the ICUs patients, so there may be gaps between the reported and actual practice. Even though the study was done in the two hospitals in Kelantan, but this research could not be generalized to other nurses in other ICUs in Malaysia.

### Conclusion

The results of this study indicate oral care currently provided in ICUs were not evidence based. The nurses provided the oral care based on their nursing training. The result of this study will increase the awareness of the nurses of recommending oral care practices for mechanically ventilated patients. There were clear needs to promote the development of a research-based nursing curriculum in relation to oral care. Theory and practice need to be closely integrated to discourage the ritualistic practice. Nurses for assessing the oral care needs of patients required instruments and adequate supplies should be provided to help the nurses fulfill their role.

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